

APPLICANT(S): KLIATZKIN, Vladimir
SERIAL NO.: 10/070,501
FILED: March 7, 2002
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AMENDMENTS TO THE SPECIFICATION

In the Title:

Please replace the Title with the following Title: ELECTROCHEMICAL CELL IN A RECHARGEABLE BATTERY

In the Specification:

References to page and line numbers in the below amendments refer to the Substitute Specification filed on March 25, 2004.

Please replace the paragraph beginning on page 4, line 9 with the following rewritten paragraph:

-- Various pairs of metals or compounds can be used, such as Ag/Zn, Pb/PbO, Ni/Cd, etc.--

Please replace the paragraph beginning on page 4, line 11 with the following rewritten paragraph:

-- The electrodes can be fabricated in the form of lengthy ribbons which are then rolled into a spiral configuration. In such a design, it is advantageous to provide a spring or spring-like means to apply pressure for example to the external surface of the electrodes and to fabricate the cells in cylindrical form. In some embodiments of the present invention, the thickness of each electrode may be between about 1 and 10 mm.--

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Please replace the paragraph beginning on page 4, line 15 with the following rewritten paragraph:

-- The pressure might be exerted by virtue of a spring or spring-like element ~~may be~~ for example an entirely separate element, which is included in the battery or pressure can be exerted due to swelling of the ~~associated with a swelling~~ separator material. The separator may include three layers, the first layer imparting mechanical strength to the separator and providing first stage protection from Silver oxide penetration; this layer may be made, for example, from a nylon, polypropylene or polyethylene treated woven fabric; a second layer or layers may prevent whisker and Silver penetration and may be made, for example, from cellulose materials that increase in volume in electrolyte and produce a pressure, which may be constant, and electrical contact between the Particles of the active materials; and a third layer, which may be made, for example, of a polyethylene-polypropylene film and executed in the form of a bag. Alternatively, the flexibility of the battery cell's walls can function as the spring element. A separate spring element is best suited for flat batteries where cell wall height is limited. The side walls of the cell are best suited to serve as the spring element when the cell has a cubic, or at least rectangular, shape. Flexible outer cylindrical containers can function as the spring element for cells with helical electrodes.--

Please replace the paragraph beginning on page 4, line 23 with the following rewritten paragraph:

-- The powder or grains of the active material are preferably in the ~~5~~ 1 to 10 micron range, although other sizes can be used.--

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Please replace the paragraph beginning on page 5, line 1 with the following rewritten paragraph:

-- The sheet grids may be made from cadmium, Zinc, tin or indium which are suitable for anodes or expanded metals, such as silver Silver or Nickel (for Ag-Zn element) which, for example, may be suitable for cathodes. These are manufactured from expanded metal foil ~~relevant to~~ suitable for the active material of the cathode or anode. Conductive fabric thickness is generally about 10 μ to 500 μ , with a preferable thickness being about 100 μ . The fabric can be woven from carbon fibers. Conductive materials may be coated with suitable metals, such as, for example, Nickel or Silver for the cathode and tin, indium, cadmium, lead, or Zinc for the anode, the exact metal depending on the nature of the electrochemical couple in the cell and the environment in which the cell operates.--

Please replace the paragraph beginning on page 9, line 15 with the following rewritten paragraph:

-- Reference is now made to Fig. 2. Figures 2A and 2B are views of a design of a unit cell of fabric. Electrode conductor 201 may be associated either with (cathode or anode) and [[is]] woven from carbon fibers. Again, the fibers do not require special treatment to increase their surface area.--

Please replace the paragraph beginning on page 9, line 19 with the following rewritten paragraph:

-- Electrode conductor 201 is embedded into a slurry containing particles 202 of made ~~from a zinc~~ Zinc, lead or ~~silver~~ Silver oxide slurry 202.--

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Please replace the paragraph beginning on page 9, line 21 with the following rewritten paragraph:

-- Electrode bag 203 can be provided with lattice or diagonal seams 207 to prevent agglomeration of the slurry powder 202 into a single piece. This helps to ensure ~~[[an]]~~ a homogeneous particle ~~adequate powder~~ distribution on the ~~electrode~~ surface of the electrode conductor 201. The electrode bags 203 are in separate insulation chambers 204.--

Please replace the paragraph beginning on page 10, line 4 with the following rewritten paragraph:

-- A couple of these insulated electrodes (cathode and anode) have one difference: the consistency of slurry 202. In an accumulator design, the electrode pair or set of electrode pairs may be held under pressure by virtue of elasticity of insulation chambers 204, which function as spring elements 204 of a different form. This saves the pressure needed for electrical contact between slurry and conductive fabric and between separate slurry nucleus (about 0.5 kg/cm²). ~~However, this~~ This pressure supplies ~~supply~~ the needed ~~needs~~ structural electrode body integrity.--

Please replace the paragraph beginning on page 10, line 17 with the following rewritten paragraph:

-- The shape of the electrode and its position in a battery cell may vary. Among the various alternatives which can be used ~~[[in]]~~ is a plate-like electrode, for example, with trim placing or a circular electrode in a coaxial structure. Electrolyte may be stored permanently in

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shell 205 or supplied periodically from an external source for example by special welding tubes.--

Please replace the paragraph beginning on page 10, line 21 with the following rewritten paragraph:

-- Figure 3 is a sectional view of a spiral design for electrodes. A pair of flexible electrodes 301 and 302 of the form shown in Figs. 1 or 2 are rolled into a spiral and inserted into an elastic sleeve 303, the latter serving as a spring element to ensure adequate contact pressure (0.2 kg/cm^2). The rolled spiral with spring elements is inserted into outer housing 304. In some embodiments, the pressure on the electrodes may be maintained due to swelling of the separator material or due to elasticity of the and outer housing ~~may also serve as the spring elements.~~--